

What is claimed is:

1 1. A method for dynamically identifying clusters of related data comprising:
2 launching a probe from a first position in an M-dimensional space, said M-
3 dimensional space having a plurality of data points, each of said plurality of data points
4 associated with a data record, each data record having at least M number of data fields;
5 determining a new position for said probe in said M-dimensional space based on a
6 current position of said probe relative to at least a portion of said plurality of data points in
7 said M-dimensional space;
8 moving said probe from said current position to said new position;
9 repeating said determining a new position for said probe until said new position and
10 said current position are approximately a same position;
11 dynamically identifying a cluster upon determining said same position in said M-
12 dimensional space.

1 2. The method of claim 1, further comprising launching another probe from another
2 position in said M-dimensional space to initiate identification of another cluster in said M-
3 dimensional space.

1 3. The method of claim 1, wherein said launching another probe from another position
2 comprises randomly determining said another position in said M-dimensional space.

1 4. The method of claim 1, wherein said launching another probe from another position
2 comprises determining said another position in said M-dimensional space outside a
3 predetermined proximity from a previous probe trajectory.

1 5. The method of claim 1, wherein said launching another probe from another position
2 comprises determining said another position in said M-dimensional space beyond a
3 predetermined proximity from said identified cluster.

1 6. The method of claim 1, wherein said launching another probe from another position
2 comprises determining said another position as one of said plurality of data points.

7. The method of claim 1, wherein said launching another probe from another position comprises determining said another position in said M-dimensional space as one of said plurality of data points that is outside of a predetermined proximity from a previous probe trajectory and beyond a predetermined proximity from said identified cluster.

8. The method of claim 1, wherein said determining a new position for said probe comprises applying a localized force function to said probe.

9. The method of claim 8, wherein said determining a new position for said probe comprises applying a localized coulomb force function to said probe.

10. The method of claim 8, wherein said determining a new position for said probe comprises applying a localized force function to said probe, said force function based on a radial distance between said probe and each of said plurality of data points.

11. The method of claim 8, wherein said determining a new position for said probe comprises applying a potential function to said probe.

12. The method of claim 8, wherein said determining a new position for said probe comprises applying a potential function to said probe, said potential function based on at least one of a weight function and a quadratic function.

13. The method of claim 12, wherein said applying a potential function to said probe comprises applying a product of a weight function and a quadratic function.

14. The method of claim 13, wherein said applying a potential function to said probe comprises applying a potential function of the form $V=R^2 \cdot \exp(-R^2/2 \sigma^2)$, where "V" is the potential between said probe and one of said plurality of data points, "R" is the distance in said M-dimensional space between said probe and said one of said plurality of data points, and " σ^2 " is an estimate of noise variance associated with said plurality of data points.

15. The method of claim 11, further comprising minimizing a sum of said potential functions applied to each of said at least a portion of said plurality of data points.

1 16. The method of claim 15, wherein said minimizing a sum of said potential functions
2 comprises minimizing a sum of said potential functions applied to each of said plurality of
3 data points.

1 17. A method for dynamically identifying a number of clusters of related data from a
2 plurality of data records each having a plurality of data fields, the data represented as N
3 data points in an M-dimensional space where M is less than or equal to a number of the
4 plurality of data fields and N is less than or equal to a number of the plurality of data
5 records, the method comprising:

6 initializing a current position of a data probe as a first position in the M-dimensional
7 space;

8 determining a new position for said data probe in the M-dimensional space based on
9 a similarity between said data probe as indicated by said current position and at least a
10 portion of the N data points in the M-dimensional space;

11 adjusting said current position of said data probe to said new position;

12 repeating said determining a new position and said adjusting said current position
13 until said new position and said current position are approximately a same position; and

14 once said new position and said current position are approximately said same
15 position, incrementing a count of the number of clusters of related data.

1 18. The method of claim 17, further comprising:

2 reinitializing a current position of said data probe as a second position in the M-
3 dimensional space, said second position different from said first position.

1 19. The method of claim 18, further comprising:

2 repeating said determining a new position and said adjusting said current position
3 until said new position and said current position are approximately a second same position.

1 20. The method of claim 19, further comprising:

2 if said second same position is a unique same position, then incrementing said count
3 of the number of clusters of related data.

1 21. The method of claim 18, wherein said reinitializing a current position of said data
2 probe as a second position comprises selecting said second position as one of said plurality
3 of data points.

1 22. The method of claim 18, wherein said reinitializing a current position of said data
2 probe as a second position comprises selecting said second position from one of said N data
3 points.

1 23. The method of claim 18, wherein said reinitializing a current position of said data
2 probe as a second position comprises selecting said second position from outside a previous
3 probe trajectory.

1 24. The method of claim 17, wherein said determining a new position for said data
2 probe in said M-dimensional space comprises determining a relative distance between said
3 data probe and one of the N data points.

1 25. The method of claim 17, wherein said determining a new position for said data
2 probe in said M-dimensional space comprises determining a relative distance between aid
3 data probe and each of said at least a portion of the N data points.